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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/884,256	06/19/2001	Jingsong Xia	31075-7 EQ3	3823

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EXAMINER	
PATHAK, SUDHANSHU C	
ART UNIT	**PAPER NUMBER**
2634	8

DATE MAILED: 06/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/884,256	XIA ET AL.	
	Examiner	Art Unit	
	Sudhanshu C. Pathak	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *June 19th, 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *June 19th, 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-to-13 are pending in the application.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 8-9, 11-12 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 3 of copending Application No. 09/876,547 (PG-Pub No. 2002/0191716). Although the conflicting claims are not identical, they are not patentably distinct from each other.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Regarding to Claim 8, the claim merely broadens the scope of the copending application claim 3, by eliminating the" mapper" between the trellis decoded signal and the decision feedback equalizer. It is held that the omission of an element and its function is an obvious expedient if the

remaining elements perform the same function as before, *In re Karlson*, 136 USPQ 184 (CCPA). Also note *Ex parte Rainu*, 168 USPQ 375 (Bd. App. 1969); omission of a reference element whose function is not needed would be obvious to one skilled in the art.

Regarding to Claims 9 & 11, the claims provide further limitation to the parent claims by disclosing the trellis decoder to be a Viterbi decoder. It is obvious to one of ordinary skill in the art at the time of the invention that the trellis decoder can be implemented using the Viterbi algorithm. The selection of the Viterbi Algorithm, to implement the trellis decoder, is a matter of design choice and there is no criticality in implementing this algorithm.

Regarding to Claim 12, the claim provides further limitation to the parent claim by disclosing the Viterbi decoder to have 16 stages. It is obvious to one of ordinary skill in the art at the time of the invention that the Viterbi decoder comprises multiple stages, and the implementation of the Viterbi decoder with 16 stages is a matter of design choice and there is no criticality in implementing the decoder with 16-stages.

4. Claims 10 & 13 are provisionally rejected under the judicially created doctrine of double patenting over copending Application No. 09/876,547 (PG-Pub No. 2002/0191716). This is a provisional double patenting rejection since the conflicting claims have not yet been patented.

Regarding to Claim 10, the subject matter claimed in the instant application is fully disclosed in the referenced copending application, Claim 3, and would be covered by any patent granted on that copending application

since the referenced copending application and the instant application are claiming common subject matter, as follows: An adaptive equalizer comprising a trellis decoder, a mapper, and a decision feedback equalizer; wherein the information from the trellis decoder passes through the mapper before it is input into the decision feedback equalizer.

Regarding to Claim 13, the subject matter claimed in the instant application is fully disclosed in the referenced copending application, Claim 5, and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter, as follows: An adaptive equalizer comprising an FIR filter; a trellis decoder coupled to the FIR filter; a mapper; a decision feedback equalizer coupled to the FIR filter and the trellis decoder via the mapper; wherein the decoded output is mapped and scaled by the mapper and used by the adaptive equalizer to generate an error signal.

Furthermore, there is no apparent reason why applicant would be prevented from presenting claims corresponding to those of the instant application in the other copending application. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

5. Claims 1-6 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over copending Application No. 09/876,547 (PG-Pub No. 2002/0191716) in view of Birru (PG-Pub No. 2002/0172275).

This is a provisional obviousness-type double patenting rejection.

Regarding to Claims 1 & 3-6, the subject matter claimed in the instant application is fully disclosed in the referenced copending application, Claim 3, and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter, as follows: An adaptive equalizer comprising a trellis decoder; a mapper coupled to the decoded output; a decision feedback equalizer coupled to the mapped output. The claims also disclose that the decoder is a Viterbi decoder further comprising 16-stages. It is obvious to one of ordinary skill in the art at the time of the invention that the trellis decoder can be implemented using the Viterbi algorithm, and that the Viterbi decoder comprises multiple stages, therefore, the selection of the Viterbi Algorithm, to implement the trellis decoder and further implementing the decoder with 16-stages, is a matter of design choice and there is no criticality in implementation of the decoder algorithm as described above. Furthermore, it is also obvious that a decision feedback equalizer can be implemented as a filter with multiple taps depending on the accuracy and computational complexity desired, and the selection of 16-taps is a matter of design choice and there is no criticality in implementing the DFE as described above.

Birru discloses the implementation of a trellis decoder in combination with a decision feedback equalizer (Fig. 9). Birru further discloses the implementation such that each decoder output stage is mapped to a

respective one of the taps of the equalizer (Fig. 8 & Fig. 10) wherein the error signal is generated from the final decoding stage.

Regarding to Claim 2, the subject matter claimed in the instant application is fully disclosed in the referenced copending application, Claim 5, and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter, as follows: the claim provides a further limitation to the parent claims by disclosing the adaptive equalizer to further comprise a FIR filter. This limitation and the limitations of the parent claims are fully disclosed in the "Claim 5" of the above referenced copending application, and the above discussion in regards to the parent claim.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Birru (PG-Pub No. 2002/0172275) in view of Xia et al. (PG-Pub No. 2002/0186762).

Regarding to Claim 1 & 3-12, Birru discloses an adaptive equalizer (Fig. 9) comprising a Viterbi decoder having multiple stages and producing a decoded output (Fig. 9, element 250 & Fig. 15, element 250 & Paragraphs 58-60 & Fig.

10, elements 1030-1060); a decision feedback equalizer (DFE) having multiple taps (Fig. 9, element 720 & Fig. 15, element 1520 & Fig. 10, element 720); wherein the output of the decoder stages is mapped to the respective taps of the decision feedback equalizer such that the taps receive the output from the earliest decoding stages (Fig. 10 & Fig. 12). However, Birru does not specify the Viterbi decoder having 16 stages and the decision feedback equalizer having more than 16 taps and a mapper element between the decoder and the decision feedback element.

Xia discloses an adaptive equalizer (Abstract, lines 1-11 & Fig. 8) comprising a Viterbi decoder and a mapper coupled to the decoded output, the mapper producing a mapped output (Paragraph 27 & Fig. 8, elements 350, 727). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Xia teaches implementing a mapper, at the output of a viterbi decoder, to generate a mapped and scaled output, and this can be implemented in the adaptive equalizer as described in Birru such that the taps of the decision feed back equalizer receive as input the mapper output from the respective stages of the viterbi decoder. Furthermore, it is a matter of design choice to implement the decoder with 16 stages and the decision feed back equalizer with more than 16 taps or fewer than 16 taps depending on the accuracy or the complexity desired in implementing the adaptive equalizer, therefore there is no criticality in the selection of the decoder stages and the DFE taps.

Regarding to Claim 2 & 13, Birru in view of Xia discloses an adaptive equalizer comprising a viterbi decoder, a mapper coupled to the decoder output, a decision feed back equalizer (DFE) coupled to the output of the mapper, wherein the input to each of the respective taps of the DFE is the output of the respective decoder stages via the mapped output as described above. Birru also discloses the adaptive equalizer further comprising an FIR filter (Fig. 9, element 710 & Fig. 10, element 710 & Fig. 15, element 1510 & Fig. 8 & Paragraphs 72-73). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Birru in view of Xia satisfies the limitations of the claims.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhanshu C. Pathak whose telephone number is (703) 305-0341. The examiner can normally be reached (Monday-Friday from 8:30 AM to 5:30 PM).

   If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin, can be reached at (703) 305-4714.

   Any response to this action should be mailed to:

   - Commissioner of Patents and Trademarks Washington, D.C. 20231

   Or faxed to:

   - (703) 872-9314 (for Technology Center 2600 only)

   Hand-delivered responses should be brought to:

   - Crystal Part II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to:

Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

STEPHEN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600